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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,329

12/18/2006

Liming Lou

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8034

22850

7590

03/25/2011

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ALEXANDRIA, VA 22314

EXAMINER

LIU, HENRY Y

ART UNIT

PAPER NUMBER

3654

NOTIFICATION DATE

DELIVERY MODE

03/25/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/577,329	<b>Applicant(s)</b> LOU ET AL.	
	<b>Examiner</b> HENRY LIU	<b>Art Unit</b> 3654	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 7/21/2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6,9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 9, and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/25/2010</u> .   | 6) <input type="checkbox"/> Other: _____                          |

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/18/2010 has been entered.

**DETAILED ACTION**

Claims 1-4, 6, 9, and 10

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 4, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over KANEHIRA (6,432,011) in view of MORSE (1,651,832).

Regarding Claim 1, KANEHIRA teaches "A power transmission chain including: a plurality of links (14) having front and back insertion parts (24) through which pins (L1,

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L2, S1, S2) are inserted; and a set of pins comprising a plurality of first pins (L2) and a plurality of second pins (S2) for connecting the links aligned in a chain width direction so as to be bendable in a longitudinal direction such that a front insertion part of one link (14) and a back insertion part of another link (14) correspond to each other, in which a first pin (L2) fixed to a front insertion part (24) of one link and movably fitted in a back insertion part of another link and a second pin (S2) movably fitted in the front insertion part of the one link and fixed to the back insertion part of the other link move relatively in a rolling and contacting manner so as to enable bending in a longitudinal direction between the links (Fig. 1), wherein at least two kinds of said sets of pins (R1, R2) are provided, in which loci of rolling contact movement of the first pin and the second pin are different in each of the kinds of sets of pins (Col. 4 lines 48 - Col. 5 line 11, Col. 5 lines 28-49), and wherein one or another of said at least two kinds of sets of pins are arranged randomly in said plurality of links (Col. 4 lines 64-68).” The loci of rolling contact movement is different since the contact points between the pins are spaced at different intervals or pitches when the chain is in a straight line state.

KANEHIRA does not teach wherein a locus of a contact position of the first pin and the second pin is an involute of a circle, and a basic circle radius of an involute of the one of said two kinds of sets of pins is larger than a basic circle radius of an involute of the another of said two kinds of sets of pins.

MORSE teaches a locus of a contact positions of the first pin (9) (13) and the second pin (12) (10) is an involute of a circle, and a basic circle radius of an involute of

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the one (9) (12) of said two kinds of sets of pins is larger than a basic circle radius of an involute of the another (13) (10) of said two kinds of sets of pins.

It would have been obvious to one of ordinary skill in the art at the time the invention was met to modify the pins in KANEHIRA with the different contact position involute circle radii in MORSE to create a quiet chain and to reduce chain vibration.

Regarding Claim 2, KANEHIRA as modified teaches “wherein two or more kinds of links having different pitches are provided, and one or another of said two or more kinds of links are arranged the links are arranged randomly in the power transmission chain (Col. 4 lines 48 - Col. 5 line 11).”

Regarding Claim 6, KANEHIRA as modified teaches a locus of a contact position of the first pin and the second pin is an involute of a circle, and a basic circle radius of an involute of a link having a large pitch is larger than a basic circle radius of an involute of a link having a small pitch (Col. 4 lines 48 - Col. 5 line 11, Col. 5 lines 28-49, Fig. 1) (MORSE Fig. 2).

**As per claim 3**, KANEHIRA as modified teaches all the structural limitations of the claimed invention, but do not explicitly disclose a locus of the rolling contact movement is an involute curve of a circle whose basic circle radius is  $R_b$  obtained by  $x = R_b(\sin \gamma - \gamma \cos \gamma)$ , and  $y = R_b(\cos \gamma + \gamma \sin \gamma) - R_b$ , where a contact position of the first pin and the second pin in a chain

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linear part is an origin, a chain linear direction is an x axis, a direction orthogonal thereto is a y axis, and an angle defined by a pin tangential direction with respect to the y axis at a contact position of the first pin and the second pin in a chain curved part is  $\gamma$ .

However, the reference teaches two different radii of two different pins' loci of rolling contact movement. Based on this teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the circle radius of the locus of rolling contact movement to be  $x = R_b(\sin \gamma - \gamma \cos \gamma)$ , and  $y = R_b(\cos \gamma + \gamma \sin \gamma) - R_b$  in order to reduce level of noise generated during use.

Also, *MPEP 2144.05 II A* states that it is not inventive to discover the optimum or workable ranges by routine experimentation.

**As per claim 4**, KANEHIRA as modified teaches all the structural limitations of the claimed invention, but do not explicitly disclose the following relationships are established:  $R_b = kR$ , and  $0.25 < k < 2r$ , where, when used as a chain for a CVT, a minimum radius of the chain curved part is  $R$ , and a transmission ratio of the CVT is  $r$ .

However, the reference teaches the chain is a transmission chain (see abstract). Based on this teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the basic circle radius to be  $R_b = kR$ , and  $0.25 < k < 2r$  in order to reduce level of noise generated during use.

Also, *MPEP 2144.05 II A* states that it is not inventive to discover the optimum or workable ranges by routine experimentation.

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over KANEHIRA (6,432,011) in view of MORSE (1,651,832) and further in view of VAN ROOIJ (5,728,021).

Regarding Claim 10, KANEHIRA as modified does not disclose [basic circle radius of involute]/[height of pin]=5 to 20.

Van ROOIJ teaches a ratio of involute to height of pin in Fig. 9. It is seen that height of pin (101) is greater than basic circle radius. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the ratio of [basic circle radius of involute]/[height of pin]=5 to 20 in order to reduce level of noise generated during use.

Also, *MPEP 2144.05 II A* states that it is not inventive to discover the optimum or workable ranges by routine experimentation.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over KANEHIRA (6,432,011) in view of MORSE (1,651,832) and further in view of MOTT (4,650,445).

Regarding Claim 9, KANEHIRA as modified teaches all the elements of Claim 9 except "A power transmission device comprising: a first pulley having a sheave face in a conical surface shape; a second pulley having a sheave face in a conical surface shape; and a power transmission chain provided over the first pulley and the second pulley, wherein the power transmission chain is one according to any of claims 1 or 2."

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MOTT teaches a power transmission device (29) comprising: a first pulley (11) having a sheave face in a conical surface shape; a second pulley (15) having a sheave face in a conical surface shape; and a power transmission chain (31) provided over the first pulley (11) and the second pulley (15), wherein the power transmission chain is one according to any of claims 1 or 2.”

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the chain in KANEHIRA with the transmission in MOTT to create a quiet transmission.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-4, 6, 9, and 10 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENRY LIU whose telephone number is (571) 270-7018. The examiner can normally be reached on Mon-Thurs 7:30am - 5:00pm ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL MANSEN can be reached on (571)272-6608. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael R Mansen/  
Supervisory Patent Examiner, Art Unit 3654

/H. L./  
Examiner, Art Unit 3654